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(12) United States Patent Okubo et al.

(54) **HYBRID VEHICLE**

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(56) References Cited

U.S. PATENT DOCUMENTS

(Continued)

FOREIGN PATENT DOCUMENTS

CN 102348567 A 2/2012 JP 2009-036354 A 2/2009 (Continued)

OTHER PUBLICATIONS

Official Communication dated Oct. 26, 2016 in the corresponding Chinese Application No. 201380072126.3.

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(57) ABSTRACT

A hybrid vehicle is provided in which in the neutral range or the parking range, power can be generated in a first power generation mode by engaging an odd-numbered position clutch so as to transmit a driving force of an engine to a motor/generator via a first input shaft, and power can be generated in a second power generation mode by engaging an even-numbered position clutch so as to transmit the driving force of the engine to the motor/generator via reversing means and the first input shaft. Therefore, according to the status of the odd-numbered position clutch and the even-numbered position clutch, by engaging either one thereof, it becomes possible to generate power in the first (Continued)

